CLAIMS

What is claimed is:

1. A method for rendering an image described in a multi-colorant color space, in a single-colorant color space, the method comprising:

generating a continuously variable screening tool operative to provide a texture corresponding to each hue and saturation in the multi-colorant color space, and

transforming the multi-colorant description of the image based on the continuously variable screening tool thereby creating a single-colorant description of the image.

2. The method for rendering an image of claim 1 wherein the step of generating a continuously variable screening tool further comprises:

defining a neutral screen associated with neutral color;

defining a plurality of primary screens associated with a plurality of hues from the multi-colorant color space.

3. The method for rendering an image of claim 2 further comprising the step of generating a set of blended screens associated with a set of remaining hues by performing a weighted blend between nearby screens.

4. The method for rendering an image of claim 3 wherein the step of generating a set of blended screens further comprises blending between two primary screens to generate an intermediate screen screen_hue(φ) using the equation: $\text{Screen\_hue}(\Phi) = (1-\alpha)^* S_k + \alpha^* S_{k+1}$

where Φ is a hue angle of a pixel being transformed, k is an index indicating one of the primary screens, k+1 indicates another primary screen such that $\Phi_k < \Phi < \Phi_{k+1}$, where Φ_k and Φ_{k+1} are hue angles associated with the primary screens S_k and S_{k+1} respectively and where

$\alpha = (\Phi - \Phi_k) / (\Phi_{k+1} - \Phi_k)$.

5. The method for rendering an image of claim 4 wherein the step of generating a blended screen further comprises blending between a neutral screen and the intermediate screen Screen_hue(Φ) to generate a blended screen screen(Φ,σ) using the equation:

screen(Φ,σ) = (1-w(σ))S_0 + w(σ) Screen_hue(Φ))

where S_0 is the neutral screen, and w(σ) is a function of saturation σ having a value between 0 and 1.

6. The method for rendering an image of claim 3 wherein the step of generating a blended screen further comprises blending between a primary screen and the neutral screen.

7. The method for rendering an image of claim 1 wherein the step of generating a single-colorant version of the image further comprises marking media as directed by the single-colorant description of the image.

8. The method for rendering an image of claim 7 wherein the step of marking media further comprises comparing a luminance of a pixel from the image with an associated screen value and placing a mark on the media if the luminance value is above the screen value.

9. The method for rendering an image of claim 7 wherein the step of marking media further comprises comparing a luminance of a pixel from the image with an associated screen value and placing a mark on the media if the luminance value is below the screen value.

10. The method for rendering an image of claim 2 wherein the step of defining a neutral screen further comprises generating a screen based on the product of two cosine functions.

11. The method for rendering an image of claim 2 wherein the step of generating a neutral screen further comprises generating a high frequency dot screen.

12. The method for rendering an image of claim 2 wherein the step of generating a neutral screen further comprises generating a forty-five degree high frequency dot screen.

13. The method for rendering an image of claim 2 wherein the step of generating a plurality of primary screens further comprises generating a plurality of hue dependent screens, each of the plurality of screens having at least one common dot location for a maxima and at least one common dot location for a minima.

14. An image processor operative to render a single colorant version of a multicolor image, the image processor comprising:

a continuously variable screening tool generator operative to generate a different screen texture for every hue and saturation in the multicolor image.

15. The image processor of claim 14 wherein the image processor is a reprographic image processor.

16. The image processor of claim 14 wherein the image processor is a general-purpose computing device.

17. The image processor of claim 14 wherein the image processor is a business graphic authoring device.

18. The image processor of claim 14 wherein the continuously variable screening tool generator further comprises:

a reference screen storage device operative to store a set of predetermined reference screen patterns in association with locations within a color space; and

a screen blender operative to access the screen storage device and use the reference screens to calculate screen patterns for colors in the multicolor image that do correspond to locations in the color space that are different that the locations in the color pace associated with the reference screens.

19. An image processor operative to render a single colorant version of a multicolor image, the image processor comprising:

a print engine;

a continuously variable screening tool generator operative to generate a different screen texture for every hue and saturation in the multicolor image;

an image transformer operative to apply the different generated screen textures in transforming the multicolor image to generate a single colorant version of the image;

a marker operative to use the single colorant version of the image as a basis for controlling the print engine to render the single colorant version of the image.

20. The image processor of claim 20 wherein the print engine is a xerographic printer.